

SURVEY OF ULTRAVIOLET SHUTTLE GLOW

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The University of Colorado Get Away Special (GAS) project (G-285) utilizes the efforts of over 100 students for the purpose of placing four experiments on the shuttle. The undergraduate and graduate students have designed and are constructing each experiment, as well as the engineering support subsystems.

The objective of one experiment, the shuttle glow study, is to conduct a general survey of emissions in the ultraviolet near vehicle surfaces. An approximate wavelength range of 1900-3000 Å will be scanned to observe predominant features. Special emphasis will be placed on studying the band structure of NO near 2000 Å and the Mg⁺ line at 2800 Å.

The spectrometer, of Ebert-Faste 1/8-meter design, will perform the experiment during spacecraft night. It will be oriented such that the optical axis points to the cargo bay zenith. In order to direct the field-of-view of the instrument onto the shuttle vertical stabilizer (tail), a mirror assembly is employed. The mirror system has been designed to rotate through 7.5 degrees of arc using 10 positions resulting in a spatial resolution of 30 x 3 cm, with the larger dimension corresponding to the horizontal direction. Such a configuration can be attained from the forwardmost position in the cargo bay. Each spatial position will be subjected to a full spectral scan with a resolution on the order of 10 Å.

Detection of shuttle glow in the ultraviolet is anticipated, particularly at lower flight altitudes. The intensity will likely remain below a few tens of rayleighs/angstrom at a distance up to 10 meters from the tail. Spatial scans up to 3 meters from the tail surface should exhibit an intensity which is dependent on the direction of the velocity vector. Results will be published by the University of Colorado students following post-flight data analysis.